

*REMARKS**Discussion of Claim Amendments*

Claim 16 has been rewritten as an independent claim including a reference to a dissolution inhibitor. Claims 21-24 and 26 have amended to further sharpen the claim preamble and adjust the claim dependencies in view of the cancellation of claims 2-3 and 5. Claims 25 and 28 have been made to depend from claim 16. Claims 30-33 have been amended to remove obvious typographical errors. New claim 38 has been added and is directed to an embodiment of the invention. No new matter has been added.

*Discussion of Rejections*

Claims 1-6, 9-12, 14-15, 19, 21-28 and 31-37 stand rejected under 35 U.S.C. § 103(a) as allegedly unpatentable over Kunita et al. (US 2001/0009129) in view of Kinsho et al. (US 5,837,785) and Ding et al. (US 5,994,430). Claims 16 and 17 are rejected as allegedly unpatentable over Kunita et al., Kinsho et al., and Ding et al., and further in view of the alleged AAPA. Claims 7, 8, 13, 29, and 30 are rejected as allegedly unpatentable over Kunita et al., Kinsho et al., and Ding et al., and further in view of Umeda et al. (JP 05-127402 A).

Applicants have amended the claims as discussed. Applicants respectfully submit that the present claims are patentable over the cited references. The Office Action states (at last paragraph, page 2 and first paragraph, page 3) that Kunita et al. discloses a polymer comprising a group having the structure  $-S-(L)_k-Q$  wherein ... Q comprises a heterocyclic group, but fails to disclose that the polymer comprises a phenolic monomeric unit wherein the phenyl group of the phenolic monomeric unit is substituted by the specified group and that wherein S is covalently bound to a carbon atom of the phenyl group. The Office Action goes on to argue that "the main polymer chain should be selected based upon availability and economical efficiency, specifically suggesting polyvinyl polymers (last sentence of paragraph [0197]), and having ordinary skill in the art would recognize that poly(vinylphenols) are widely available, economical polyvinyl polymers."

Applicants respectfully disagree with the Office Action. Those of ordinary skill in the art would not read a polyvinylphenol to be a polyvinyl polymer. See, for example, the

indices of "Polymer Handbook", Brandrup et al. (Exhibit 1) and "Organic Polymer Chemistry", K.A. Saunders (Exhibit 2). Poly(vinylphenol) is not mentioned in the index tables in these well-known handbook or textbook. In the index tables of these books the most cited polyvinyl polymers are polyvinyl acetate, polyvinyl alcohol and, specially, polyvinylchloride, and there is no mentioning of poly(vinylphenol). See also Kunita et al., which defines "polyvinyl" by formula (3) at col. 2, line 41 and the description of Q<sup>1</sup> in formula (3) at col. 4, lines 3-9. Thus, Q<sup>1</sup> in formula (3) "includes hydrogen: alkyl such as methyl, ethyl, etc.; aryl such as phenyl, tolyl, etc.; haloalkyl such as chloromethyl, chloroethyl, etc.; haloaryl such as chloromethylphenyl, chloroethylphenyl, 2,4,6-trichlorophenyl, 2,4,6-tribromophenyl, etc.; alkoxycarbonyl such as methoxycarbonyl, ethoxycarbonyl, butoxycarbonyl, etc.; acetoxy; and --X--Z, among others." In addition, Kunita et al. describes, in the same paragraph at column 2, line 41 plus, describing polyvinyl polymers, the novolac resins as a separate category of polymers than "polyvinyl" polymers by specifically reciting a formula (9) for the novolacs. If novolacs were to be a species of polyvinyl polymers, as the Office Action argues, why would Kunita et al. represent the two classes separately? Thus, there is clear evidence that a polyvinyl polymer should not be read to cover a polyvinyl phenol or novolac resin.

The Office Action has failed to provide sufficient evidence to reach the broad assertion that polyvinylphenol would be suggested by a disclosure of a polyvinyl polymer. While the Office Action may employ a broadest reasonable interpretation of terms during examination, it cannot ignore what those of ordinary skill in the art would consider to be a fair reading of the prior art. The cited reference is written to those of ordinary skill in the art, and they should be interpreted as an artisan of ordinary skill would read. The Office Action failed in this respect. Accordingly, applicants respectfully submit that the Office Action would not make a prima facie case for obviousness of the present claims.

Further, Kinsho et al. fails to disclose substituting on the carbon atom of the novolac resin. On the contrary, Kinsho et al. teaches that the substitution is on the oxygen atom. The Office Action cites Ding et al. for teaching the substitution on the carbon atom of the aromatic ring. However, the Office Action's reliance on Ding et al. is erroneous. Ding et al. fails to disclose or suggest to those of ordinary skill in the art covalently attaching a sulfur-containing group to a carbon atom of the aromatic ring. Ding et al. merely discloses the

following groups:  $-N=N-$ ,  $-R'C=CR'-$ ,  $-R'C=N-$  or  $-N=CR'-$  (Col. 4 lines 41-65). Such a disclosure cannot suggest a sulfur-containing group to those of ordinary skill in the art. For example, at column 4, lines 30-31, Ding et al. states that the polymer “strongly absorbs ultraviolet light having a wavelength in the range of 180 nm to about 450 nm.” Ding et al. describes the dyed monomeric units at column 4, lines 41-65, wherein X, i.e., the group attached to the carbon atom of the phenyl ring is  $-N=N-$ ,  $-R'C=CR'-$ ,  $-R'C=N-$  or  $-N=CR'-$ . There is no disclosure of S-containing groups. Ding et al. also states that “the chemical structure of the dye chromophore is *critical* to provide the appropriate absorption etch characteristics and solubility in the solvents that are of low toxicity, particularly aqueous solubility. In this invention the particularly good absorption characteristics of the dye unit are provided through the X and Y groups being *conjugatively* attached to the phenolic moiety. X can be selected from the following groups,  $-N=N-$ ,  $-R'C=CR'-$ ,  $-R'C=N-$  and  $-N=CR'-$ , where R' is H or alkyl.” (Emphasis added). Clearly, those of ordinary skill in the art, in the face of the teaching that the chromophore is *critical* and that it should be *conjugatively* attached, i.e., through a double or triple bond containing group that will facilitate electronic conjugation, would not be prompted to use a sulfur containing group such as  $-S-(L)_k-Q$ , where S does not and cannot provide electronic conjugation. To proceed so, as applicants have done here, would be counter or contrary to the express teachings of the reference. Accordingly, Ding et al. cannot suggest the presently claimed invention, either by itself or in combination with one or more of other cited references.

In addition, none of the cited references teaches a method of covalently linking the group  $-S-(L)_k-Q$  to a carbon atom of the phenyl ring. The method taught in Ding et al. (Examples 1-12) is diazotization followed by coupling of the diazonium ( $N_2^+$ ) halide to the phenol. The Office Action has failed to show that those of ordinary skill in the art can follow this methodology and covalently link the  $-S-(L)_k-Q$  group to a carbon atom of the phenyl ring in a phenol. See, for example, *In re Hoeksema*, 399 F.2d 269, 158 USPQ 596 (CCPA 1968), which requires that the prior art must teach a method of making structurally similar compounds to sustain an obviousness rejection of the claimed compounds. Accordingly, applicants respectfully submit that a prima facie case for obviousness cannot be made on the present claims.

The present claims are also patentable in view of the U.S. Supreme Court's opinion in *KSR Int'l Co. v. Teleflex Inc.*, 127 S. Ct. 1727, 1731 (2007). The presently claimed invention does not represent a combination of familiar elements where each element performed their known function. The placement of the sulfur atom on the carbon atom of the novolac resin is not a familiar element. Further, the *KSR* Court acknowledged "the importance of identifying a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed invention does in an obviousness determination". See *Takeda Chemical Industries, Ltd. v. Alphapharm Pty., Ltd.*, 83 USPQ2d, 1169, 1174 (Fed. Cir. June 28, 2007) (*quoting KSR*, 127 S.Ct. at 1731). Moreover, the Court indicated that "there is no necessary inconsistency between the idea underlying the TSM test and the Graham analysis." *Takeda* at 1174. "As along as the test is not applied as a rigid and mandatory formula, that test can provide helpful insight to an obviousness inquiry." *Id.* "Thus, in new chemical compounds, it remains necessary to identify for some reason that would have led a chemist to modify a known compound in a particular manner to establish prima facie obviousness of a new claimed compound." *Id.* In the present application, which relates to new polymers (which are like new chemical compounds), there remains a need for some reason that would have led those of ordinary skill in the art to covalently link the sulfur atom to the carbon atom of the phenyl ring. Here, there is no reason in the prior art that would motivate those of ordinary skill in the art to do so, especially in view of Ding et al.'s teaching that the group that is attached to the ring carbon must be a conjugatable group. Accordingly, the present claims are non-obvious.

Applicants respectfully submit that if the Office continues to reject the claims, such a rejection would be based on an unmistakable case of hindsight reconstruction and a strained effort to arrive at the claimed invention by picking and choosing the required components from the prior art using the presently claimed invention as a roadmap and then adding some of its own imagination. It is well established that such hindsight reconstruction is impermissible. Using the applicants' disclosure as a blueprint to reconstruct the claimed invention from isolated pieces of the prior art contravenes the statutory mandate of Section 103 which requires judging obviousness at the point in time when the invention was made. See *Grain Processing Corp. v. American Maize-Prods. Co.*, 840 F.2d 902, 907, 5 USPQ2d 1788, 1792 (Fed. Cir. 1988).

*Conclusion*

A favorable decision is solicited. If, in the opinion of the Examiner, a telephone conference would expedite the prosecution of the subject application, the Examiner is invited to call the undersigned attorney.

Respectfully submitted,



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# Organic Polymer Chemistry

*An Introduction to the Organic Chemistry of  
Adhesives, Fibres, Paints, Plastics, and Rubbers*

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